UNITED STATES PATENT AND TRADEMARK OFFICE

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/671,937	09/29/2003	Fred Gehrung Gustavson	YOR920030171US1	8297

			EXAMINER
48150 7590 03/07/2007			WEI, ZHENG
MCGINN INTELLECTUAL PROPERTY LAW GROUP, PLLC			
8321 OLD COURTHOUSE ROAD			ART UNIT PAPER NUMBER
SUITE 200			
VIENNA, VA 22182-3817			2192

SHORTENED STATUTORY PERIOD OF RESPONSE	MAIL DATE	DELIVERY MODE
3 MONTHS	03/07/2007	PAPER

Please find below and/or attached an Office communication concerning this application or proceeding.

If NO period for reply is specified above, the maximum statutory period will apply and will expire 6 MONTHS from the mailing date of this communication.

PTOL-90A (Rev. 10/06)

	Application No.	Applicant(s)
Office Action Summary	10/671,937	GUSTAVSON ET AL.
	Examiner	Art Unit	
	Zheng Wei	2192	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE <u>3</u> MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.
- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
  Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1) ☒ Responsive to communication(s) filed on <u>29 September 2003</u>.

2a) ☐ This action is **FINAL**.   2b) ☒ This action is non-final.

3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4) ☒ Claim(s) <u>1-19</u> is/are pending in the application.

     4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5) ☐ Claim(s) _____ is/are allowed.

6) ☒ Claim(s) <u>1-19</u> is/are rejected.

7) ☐ Claim(s) _____ is/are objected to.

8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9) ☐ The specification is objected to by the Examiner.

10) ☒ The drawing(s) filed on <u>30 December 2003</u> is/are: a) ☐ accepted or b) ☒ objected to by the Examiner.

     Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

     Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

     a) ☐ All b) ☐ Some * c) ☐ None of:

       1. ☐ Certified copies of the priority documents have been received.

       2. ☐ Certified copies of the priority documents have been received in Application No. _____.

       3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

     * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)

2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)

3) ☒ Information Disclosure Statement(s) (PTO/SB/08)
     Paper No(s)/Mail Date <u>09/11/06, 11/21/06, 02/27/07</u>.

4) ☐ Interview Summary (PTO-413)
     Paper No(s)/Mail Date. _____ .

5) ☐ Notice of Informal Patent Application

6) ☐ Other: _____ .

DETAILED ACTION

1.   This office action is in response to the application filed on 09/29/2003.

2.   Claims 1-19 are pending and have been examined.

Oath/Declaration

3.   The Office acknowledges receipt of a properly signed oath/declaration filed on
September 29, 2003.

Priority

4.   The priority date considered for this application is September 29, 2003.

Information Disclosure Statement

5.   The information disclosure statements filed 0/11/200, 11/21/2006 and 02/07/2007
have been placed in the application file and the information referred to therein
has been considered.

Specification

6.   The disclosure is objected to because of the following informalities:

The applicant is advised to update information cited in the "Cross-Reference to

Related Applications" section under BACKGROUND OF THE INVENTION

Appropriate correction is required.

Drawings

7.   The drawings filed on September 29, 2003 and the replacement drawing filed on

December 30, 2003 are not accepted by the Examiner because of on-compliance

with 37 CFR § 1.12(d). Any changes to an application drawing must be in

compliance with 37 CFR § 1.84 and must be submitted on a replacement sheet

of drawings, which shall be an attachment to the amendment document and, in

the top margin, labeled "Replacement Sheet".

8.   The replacement sheet of FIG. 1-5 should be labeled "Replacement Sheet" in the

page header (as per 37 CFR 1.84(c)) so as not to obstruct any portion of the

drawing figures. If the changes are not accepted by the Examiner, the Applicant

will be notified and informed of any required corrective action in the next Office

Action. The objection to the drawings will not be held in abeyance.

Claim Rejections - 35 USC § 101

9.   35 U.S.C. 101 reads as follows:

Whoever invents or discovers any new and useful process, machine, manufacture, or composition of
matter, or any new and useful improvement thereof, may obtain a patent therefor, subject to the
conditions and requirements of this title.

10.   Claims 1-19 are rejected under 35 U.S.C. 101 because the claimed invention is

directed to non-statutory subject matter.

Claims 1 and 17: Claims 1 and 17 are directed to computer implemented

methods for performing execution of a linear algebra subroutine which can be

interpreted as a method of calculation that the inputs are numbers and the results

are also numbers. Claim 17 further claims providing service for solving and applying a scientific/engineering problem, which is only an abstract idea. In order for a computer related invention to be statutory, the claimed invention must accomplish a practical application. That is, the claimed invention must transform an article or physical object to a different state or thing, or produce a useful concrete and tangible result. That results of the invention are merely numerical values without a practical application recited in the claims and thus is not useful, concrete and tangible. Therefore, the claimed inventions are directed to non-statutory subject matter as the claims fail to assert a practical application to the invention.

It should be noted that claim 17 defines a "<u>signal-bearing medium</u>" that could be any type of "digital and analog and communication links and wireless", which the applicant has indicated as being included in the scope of "a signal-bearing medium". (Page 17, lines 15-16, "or other suitable signal-bearing media including transmission media such as digital and analog and communication links and wireless"). Because "signal-bearing medium" can be interpreted as a signal encoded with functional descriptive material, which does not fall within any of the categories of patentable subject matter set forth in 35 U.S.C § 101.

For further information, see Interim Guidelines for Examination of Patent Application for Patent Subject Matter Eligibility (signed 26Oct2005) –OG Cite: 1300 OG 142.

<http://www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm>

Claims 2-5 and 18-19: Claims 2-5 and 18-19 are dependent claims of claims 1 and 17 respectively. These claims all fail to remedy the 35 U.S.C 101 nonstatutory problems of claims 1 and 17.

Claims 6-11 and 12-16: Claims 6-11 and 12-16 are an apparatus and computer program product versions of method as discussed in claims 1-5 above. However, because the method claims 1-5 are non-statutory, the apparatus and computer product to implement and/or practice such method are also considered as non-statutory.

It should be noted that claims 12-16 claim a "signal-bearing medium" embodying a program. However, the "program" must reside on a computer readable medium and this computer readable medium cannot be "digital and analog and communication links and wireless", which the applicant has indicated as being included in the scope of "a signal-bearing medium". (Page 17, lines 15-16, "or other suitable signal-bearing media including transmission media such as digital and analog and communication links and wireless"). Because "signal-bearing medium" can be interpreted as a signal encoded with functional descriptive material, which does not fall within any of the categories of patentable subject matter set forth in 35 U.S.C § 101.

For further information, see Interim Guidelines for Examination of Patent

Application for Patent Subject Matter Eligibility (signed 26Oct2005) –OG Cite:

1300 OG 142. Annex IV(c)

<http://www.uspto.gov/web/offices/com/sol/og/2005/week47/patgupa.htm>

Claim Rejections - 35 USC § 102

11.   The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that

form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

12.   Claims 1, 2 and 17 are rejected under 35 U.S.C. 102(b) as being anticipated by

Nakazawa (Nakazawa et al., US 5,438,669)

Claim 1:

Nakazawa discloses a method of executing a linear algebra subroutine, said

method comprising: for an execution code controlling operation of a floating point

unit (FPU) performing said linear algebra subroutine execution, unrolling an

instruction to preload data into a floating point register (FReg) of said FPU, said

unrolling causing said instruction to load data into said FReg to be inserted into a

sequence of instructions that execute said linear algebra subroutine on said FPU.

(see for example, Fig.3, element 105, "Physical Floating Point Register Group",

element 106 "Floating Point Calculator", element 102 "Instruction Controller" and

related; Also see, Fig.4B, 4C "Floating Point Register Preload Instruction",

"Extended Floating Point Register Preload Instruction" and related text"; Further

see, col.7, lines 2-11, "the program by the loop unrolling method requires four

floating point registers and one general register for vector data storage...")

Claim 2:

Nakazawa discloses the method of claim 1, wherein said instructions are unrolled

repeatedly until the data loading reaches a steady state in which a data loading

exceeds a data consumption (see for example, col.5, lines 23-28, "With this loop

unrolling method, a plurality of elements (=n) are processed in one loop, this loop

unrolling method has 1/n the number of loops required by the conventional

method", also see Fig.11 and 12 for unrolling results and related text).

Claim 17:

Nakazawa discloses a method of providing a service involving at least one of

solving and applying a scientific/engineering problem, said method comprising at

least one of: using a linear algebra software package that computes one or more

matrix subroutines, wherein said linear algebra software package generates an

execution code controlling a load/store unit loading data into a floating point

register (FReg) for a floating point unit (FPU) performing a linear algebra

subroutine execution, such that, for an execution code controlling operation of

said FPU, an instruction is unrolled to cause a preloading of data into said FReg;

providing a consultation for purpose of solving a scientific/engineering problem

using said linear algebra software package; transmitting a result of said linear

algebra software package on at least one of a network, a signal-bearing medium

containing machine-readable data representing said result, and a printed version

representing said result; and receiving a result of said linear algebra software

package on at least one of a network, a signal-bearing medium containing

machine-readable data representing said result, and a printed version

representing said result. (see for example, Fig.3, element 105, "Physical Floating

Point Register Group", element 106 "Floating Point Calculator", element 102

"Instruction Controller" and related; Also see, Fig.4B, 4C "Floating Point Register

Preload Instruction", "Extended Floating Point Register Preload Instruction" and

related text"; Further see, col.7, lines 2-11, "the program by the loop unrolling

method requires four floating point registers and one general register for vector

data storage...")

Claim Rejections - 35 USC § 103

13.   The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all

obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set
forth in section 102 of this title, if the differences between the subject matter sought to be patented and
the prior art are such that the subject matter as a whole would have been obvious at the time the
invention was made to a person having ordinary skill in the art to which said subject matter pertains.
Patentability shall not be negatived by the manner in which the invention was made.

14.   Claims 3-16, 18 and 19 are rejected under 35 U.S.C. 103(a) as being

unpatentable over <u>Nakazawa</u> (Nakazawa et al., US 5,438,669) in view of

<u>Dongarra</u> (Dongarra et al., "A Set of Level 3 Basic Linear Algebra Subprograms")

Claim 3:

<u>Nakazawa</u> discloses the method of claim 1, but does not explicitly disclose

wherein said linear algebra subroutine comprises a matrix multiplication

operation. However, <u>Dongarra</u> in the same analogous art of implementation of

Level 3 Basic Linear Algebra Subprograms discloses matrix multiplication

operation (matrix- multiply) (see for example, p.11, line 15, "matrix-multiply

routine"). Therefore, it would have been obvious to one having ordinary skill in

the art at the time the invention was made to use <u>Nakazawa</u>'s calculator to do

matrix multiplication operation. One would have been motivated to do so to

improve efficiency and parallel processing capability as suggested by <u>Dongarra</u>

(see for example, p.1, abstract portion, lines 1-4, "The Level 3 BLAS are targeted

at matrix-matrix operations, with the aim of providing more efficient, but portable,

implementations of algorithms on high-performance computers, especially those

with hierarchical memory and parallel processing capability.")

Claim 4:

<u>Nakazawa</u> discloses the method of claim 1, but does not explicitly disclose

wherein said linear algebra subroutine comprises a subroutine from a LAPACK

(Linear Algebra PACKage). However, <u>Dongarra</u> in the same analogous art of

linear algebra discloses LAPACK (LINPACK) (see for example, p.1, Introduction, "The original basic linear algebra subprograms...have been used in a wide range of software including LINPACK [13]..."). Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to use existing routine defined or implemented by LINAPACK. One would have been motivated to do so to greatly simplify the implementation of the infrastructure as suggested by Dongarra (see for example, p.1-2, Introduction "In particular, they are an aid to clarity, portability, modularity, and maintenance of software; and they have become a de facto standard for the elementary vector operations.")

Claim 5

Nakazawa and Dongarra disclose the method of claim 4, Dongarra further discloses said LINPACK subroutine comprises a BLAS Level 3 L1 cache kernel (see for example, p.2, Introduction, "For example, no routines are included for matrix factorization; these are currently provided by LINPACK and will be included in a new linear algebra package currently under development...").

Claim 18:

Nakazawa discloses the method of claim 17, but does not explicitly disclose wherein said linear algebra subroutine comprises a subroutine from a LAPACK (Linear Algebra PACKage). However, Dongarra in the same analogous art of linear algebra discloses LAPACK (LINPACK) (see for example, p.1, Introduction,

"The original basic linear algebra subprograms...have been used in a wide range

of software including LINPACK [13]..."). Therefore, it would have been obvious to

one having ordinary skill in the art at the time the invention was made to use

existing routine defined or implemented by LINAPACK. One would have been

motivated to do so to greatly simplify the implementation of the infrastructure as

suggested by Dongarra (see for example, p.1-2, Introduction "In particular, they

are an aid to clarity, portability, modularity, and maintenance of software; and

they have become a de facto standard for the elementary vector operations.")

Claim 19:

Nakazawa and Dongarra disclose the method of claim 18, Dongarra further

discloses said LINPACK subroutine comprises a BLAS Level 3 L1 cache kernel

(see for example, p.2, Introduction, "For example, no routines are included for

matrix factorization; these are currently provided by LINPACK and will be

included in a new linear algebra package currently under development...").

Claims 6-11:

Claims 6-10 are an apparatus version of claimed method, wherein all claimed

limitations have been address and/or set forth above in claims 1-5. Therefore, as

the references teach all the limitation of claims 1-5, they also teach the limitations

of claims 6-10 respectively. Thus, they also would have been obvious.

Claims 12-16:

Claims 12-16 are a software program product version of claimed method, wherein all claimed limitations have been address and/or set forth above in claims 1-5. Therefore, as the references teach all the limitation of claims 1-5, they also teach the limitations of claims 12-16 respectively. Thus, they also would have been obvious.

Conclusion

15.   The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

16.   Any inquiry concerning this communication or earlier communications from the examiner should be directed to Zheng Wei whose telephone number is (571) 270-1059 and Fax number is (571) 270-02059. The examiner can normally be reached on Monday-Thursday 8:00-15:00.

　　　　If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Tuan Q. Dam can be reached on (571) 272-3695. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Any inquiry of a general nature of relating to the status of this application or proceeding should be directed to the TC 2100 Group receptionist whose telephone number is 571- 272-1000.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

ZW

TUAN DAM
SUPERVISORY PATENT EXAMINER